

ORIGINAL ARTICLE

Length of time in Ghana is associated with the likelihood of exclusive breastfeeding among Liberian refugees living in Buduburam

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Abstract

While literature describing immigrant's breastfeeding practices exists, especially among those living within developed countries, there is a significant gap in knowledge on how the host culture may influence the EBF behaviors of refugees, especially those living in protracted situations within sub-Saharan Africa. A cross-sectional study was conducted in the Buduburam Refugee Settlement in Ghana from July–August 2008 to explore the association between the amount of time living in Ghana and exclusive breastfeeding practices among Liberian refugees and Ghanaians in surround villages. The study included 480 women: 239 Liberians living in 12 settlement zones (in two of which Liberians and Ghanaians co-exist), 121 Ghanaians living in two settlement zones, and 120 Ghanaians living in nearby urban village of Awutu. Liberian mothers who lived in Ghana at least eight years were significantly more likely to exclusively breastfeed (OR: 1.78, 95% CI: 1.02, 3.09) compared to Ghanaian mothers living in Awutu. These findings suggest that increased time living in Buduburam improved the chances of EBF success among Liberians, perhaps as a result of unique EBF education/support opportunities offered in the settlement to Liberian refugees that were not readily available to Ghanaians. Further research to understand the “mechanisms” explaining exclusive breastfeeding differences as a function of time spent in host country is needed for improving breastfeeding support in refugee settlements and host communities.

KEYWORDS

breastfeeding, refugees, public health, maternal public health, breastfeeding duration

1 | INTRODUCTION

By the end of 2014, the number of people forcibly displaced worldwide reached the highest recorded level at approximately 59.5 million, of which 19.5 million were refugees (UNHCR, 2015). Within Africa, nearly 18 million were projected to be displaced by the end of 2015 (up from over 16.9 million in 2014) due to increased conflict and humanitarian emergencies throughout the region (UNHCR, 2016). Displaced persons are extremely vulnerable, with refugee camps often experiencing high morbidity and mortality rates. Newborn infants living in refugee camps are especially susceptible to disease and death given that their immune system is still maturing (Olwedo, Mworozi, Bachou, & Orach, 2009). Optimal infant feeding patterns can enhance infant immunity, subsequently promoting health and, ultimately, survival. Yet, little is known

about infant feeding patterns, including breastfeeding, among refugees, especially African refugees. Rather, most studies on African refugees have focused on understanding food insecurity and/or dietary practices among older children and adults (Hadley, Zodiates, & Sellen, 2007; Mokori, 2012; Patil, Maripuu, Hadley, & Sellen, 2015).

Breastfeeding is known to be protective against gastrointestinal and respiratory infections (Aidam, Pérez-Escamilla, & Larrey, 2005). Exclusive breastfeeding (EBF) provides even more protection against such morbidities (Kramer & Kakuma, 2009). An infant is considered to be exclusively breastfed if mothers solely provide breast milk for the first six months of life (WHO, 2002). Global trends across 140 countries indicate that EBF rates among infants younger than 6 months of age have increased from 33% in 1995 to 39% in 2010 with the largest improvements seen in West and Central Africa (Cai, Wardlaw, & Brown,

2012). Specifically, in Liberia, EBF rates rose from 29% in 2007 to 55% in 2013 (Liberia Institute of Statistics and Geo-Information Services, 2014). Over this time, Liberia implemented several child health initiatives that may have supported breastfeeding including the 2007 enactment of a Child Survival Strategy and Nutrition Policy, the adoption of a National Food and Nutrition Strategy in 2008, and implementation of the Integrated Management of Neonatal and Childhood Illnesses program in 2009 (International Baby Food Action Network, 2012). Within West Africa, Ghana also saw EBF rates increase substantially from less than 5% in 1989 to 52% in 2013 (Tampah-Naah & Kumi-Kyereme, 2013; Ghana Statistical Service, 2009). During the 19 years that EBF rates dramatically improved in Ghana, several breastfeeding initiatives, such as the 1991 Baby-Friendly Hospital Initiative and the implementation of the WHO code for marketing of breast milk substitutes in 2000, were enacted potentially explaining the increase in EBF rates over time (Tampah-Naah & Kumi-Kyereme, 2013).

Despite significant increases in EBF rates in West African countries over the decades, little is known about breastfeeding patterns among certain sub-groups, such as West African refugees. The limited evidence that exists from African countries suggests that breastfeeding can be challenging in emergency situations, a cause for public health concern as it can provide increased benefits to the child under humanitarian emergency situations (UNFPA, 2010; Lungaho, Clause, & Butera, 1996). A study conducted in two Rwandan refugee camps found average EBF rates were about 75%, and women who were previously displaced were significantly less likely to EBF compared to non-displaced mothers in one of the camps (Jakobsen et al., 2003). This success was in part due to the camps staff's promotion and support of baby-friendly practices, which are not commonly available in resource poor refugee camps (Loescher & Milner, 2009). Conversely, low EBF rates were observed in urban refugee women in Rwanda despite correct knowledge of EBF, positive attitudes towards EBF, and access to a health facility (Bahemuka, Munyanshonger, & Birungi, 2013).

Though refugees are a distinct population, they are often not differentiated from other immigrants, and are assessed as a collective group in research. Like immigrants, refugees may undergo acculturation, defined as a complex process of sociocultural and psychological changes that can occur due to contact with individuals or groups of different cultural backgrounds, as they live and interact with their host country (Schwartz, Unger, Zamboanga, & Szapocznik, 2010). Most literature examining the influence of acculturation on breastfeeding among immigrant/migrant populations have been conducted in

developed countries on minority racial/ethnic groups, especially Hispanics (Singh, Kogan, & Dee, 2007; Zambrana, Scrimshaw, Collins, & Dunkel-Schetter, 1997). The literature linking breastfeeding practices and acculturation among non-Hispanic immigrants is also limited, but suggests that increasing acculturation negatively affects breastfeeding outcomes (Celi, Rich-Edwards, Richardson, Kleinman, & Gillman, 2005; Gibson-Davis & Brooks-Gunn, 2006). Studies of immigrant Black women moving to developed countries, including the USA, Italy, and Australia, found poorer initiation and duration of breastfeeding with greater acculturation (Schwartz et al., 2010; Gallegos, Vicca, & Streiner, 2013; Golin, Marzari, & Zanardo, 2003).

Studies on refugee women's beliefs towards breastfeeding in their new country suggest a complex relationship exists between acculturation and breastfeeding practices (Schwartz et al., 2010; Zambrana et al., 1997; Celi et al., 2005; Gibson-Davis & Brooks-Gunn, 2006). West African female refugees living in Australia revealed that lack of sufficient food and money encouraged EBF, while introduction to formula and early provision of complementary foods happened when food and money were available (Gallegos et al., 2013). These findings may be attributed to challenges women face in relocating to a new country and no longer having access to usual support systems or being influenced by traditional cultural norms (Gallegos et al., 2013).

Although some literature describing immigrant's breastfeeding practices exists, especially among those living within developed countries, there is a significant gap in knowledge on how acculturation into the host culture may influence the EBF behaviors of refugees, especially those living in protracted situations within sub-Saharan Africa. In protracted situations, at least 25,000 refugees originating from one country have lived within their host country for at least five consecutive years (Loescher & Milner, 2009). There are an estimated 7 million refugees in protracted refugee situations, and the average length of stay has increased from 9 years in the 1990s to nearly 20 years in 2003 (Loescher & Milner, 2009). Given the length of time living within refugee conditions in their host country, these refugees may acculturate over time. This study sought to understand how acculturation may influence the EBF practices of Liberian refugees living in the long-term Buduburam Refugee Settlement in Ghana.

The Buduburam Refugee Settlement in Ghana offered a protracted refugee context that is ideal for understanding how refugees' infant feeding behaviors may be affected by their exposure to the host culture. Buduburam Refugee Settlement is home to thousands of Liberians who fled their country during Liberia's civil war of 1990 and sought refuge in Ghana (Tanle, 2013). The government of

Key messages

- Greater EBF rates among Liberian refugees living in Ghana may be best explained by varying migration patterns, traditional breastfeeding beliefs, and more access to breastfeeding support within the Buduburam settlement health care system.
- Increased support for EBF within a refugee settlement environment may result in improvements in infant feeding practices and, subsequently, infant health.
- Future research should explore the pathways by which breastfeeding practices of West African refugees living in long-term refugee camps or settlements in countries in close proximity to their country of origin can be explained.

Ghana and the United Nations High Commissioner for Refugees (UNHCR) created the refugee camp in 1990 in the Gomoa Eastern District of the Central Region. During the 1990s, over 7,000 Liberians had settled in the camp and the adjacent Ghanaian village known as Buduburam. The second civil war in Liberia in 1999 forced more Liberians to flee, and the Buduburam camp population continued to expand, totaling 18,713 refugees in 2000 and topping 40,000 in 2008 (Tanle, 2013; Omata, 2012). However, by 2012, Buduburam was no longer recognized as a refugee camp, but rather as a refugee settlement, whose refugees live in a protracted situation (Tanle, 2013).

During the 1990s, Buduburam received humanitarian assistance from the UNHCR and the World Food Program. However, decreases in funding for protracted refugees in Africa, including in West Africa, resulted in less assistance and fewer available resources for refugees (Omata, 2012). In 2000, UNHCR withdrew support from Buduburam. Liberian refugees living in Buduburam lost support for food, water, education, and medicine, and consequently became limited in their ability to earn wages in the local economy and were more likely to live in poverty (N'Tow, 2004; UNHCR, 2005). Lack of UNHCR assistance combined with a rapidly growing refugee population saw a deterioration in facilities in the settlement to below international standards (UNHCR, 2005). In 2002, UNHCR assistance to Buduburam resumed. The World Food Program reintroduced its Food Assistance Program in 2004, supplying food only to vulnerable refugees (i.e., pregnant women, older adults, malnourished children). In 2005, the Supplementary Feeding Program was established, in conjunction with a broader nutrition program to provide education and nutrition support to refugees (UNHCR, 2005). Despite the existence of these programs, a 2012 study conducted in Buduburam Refugee Settlement among Liberian refugees found that 57% experienced moderate food insecurity (Sandow, 2012).

To our knowledge, this study is the first to compare EBF practices as a function of acculturation among protracted refugee populations and their host population living in a long-term camp in Sub-Saharan Africa. Study findings can have policy and practice implications for improving EBF behaviors and subsequently, infant health in protracted refugee situations.

2 | METHODS

The data presented are drawn from the quantitative survey administered in a larger mixed methods study designed to identify shifts in diet, food access and availability, and cultural beliefs among Liberian refugees living in Buduburam Refugee Settlement. The larger mixed methods study focused on three objectives: (a) understanding changes in dietary practices of Liberians living in the settlement; (b) assessing food availability, food access, dietary practices, and cultural beliefs of Liberians and the relationship with nutritional status; and (c) assessing how Liberians influenced these dietary factors among Ghanaians living in Buduburam or in a surrounding village. To achieve the main study objectives: (a) an in-depth interview was administered to two to three generations of Liberian refugee and Ghanaian caretakers living within and around Buduburam and (b) a quantitative survey was administered to Liberian refugee and Ghanaian women living within and around

Buduburam. The mixed methods study setting included Buduburam and the adjacent urban village of Awutu, located 5 km from the settlement. Buduburam is composed of 12 zones, with zones 1–10 being settled predominately by Liberian refugees. Zones 11–12 include the original village of Buduburam and the outlying areas where both Liberians and Ghanaians households coexist. Infant feeding practices were only examined through the quantitative component of the study; thus, findings from the qualitative component are not presented in this article.

2.1 | Participants

Liberians and Ghanaian female caretakers living in Buduburam and Awutu village were recruited to participate in the quantitative survey component of the study. Women were eligible for the study if they met the following criteria: (a) Liberian or Ghanaian, (b) at least 16 years old, (c) having a biological child that was between 6 and 59 months at the time of the survey, (d) not being pregnant, (e) not having health problems or conditions that would cause any changes in their diet, and (e) must have lived in either Buduburam or in an Awutu village located less than 5 km from Buduburam. If there were multiple children in the household between 6 and 59 months, the youngest child was the index child.

2.2 | Procedure and measures

A cross-sectional survey was administered between July and August 2008. The survey included demographic, socioeconomic, household food security, infant feeding practices, maternal dietary intake, acculturation, and maternal health status questions. The survey was first pilot-tested with five Liberians and four Ghanaian women of the target population, and revised accordingly. The survey was administered to 480 women from all 12 Buduburam settlement zones and Awutu following a systematic sampling approach (i.e., selection of every fifth house). Within Buduburam, 12 interviews were conducted in each zone except for zones two (13 interviews) and eight (11 interviews). Within each zone, the central location was first identified. Standing within that central location, interviewers randomly selected a direction and visited the first house observed. Interviewers then moved to every fifth house to recruit and interview participants. If the house was empty, interviewers revisited the house until they received a reply. If an occupant of the house did not meet eligibility, interviewers continued onto the next fifth house. Interviewers continued interviewing within each zone until the required sample size was achieved. For interviews conducted in Awutu, a local villager assisted interviewers in locating houses and introducing residents. The same sampling method was used of selecting every fifth house. The final sample included 120 Liberians from zones 1–10, 119 Liberians from zones 11–12, 121 Ghanaians from zones 11–12, and 120 Ghanaians from urban, Awutu villages 5 km from Buduburam.

Four interview teams, each composed of one Ghanaian and one Liberian, conducted all interviews. The Liberian interviews were administered by Liberians in Liberian pigeon English and Ghanaian interviews were administered by Ghanaians in either English or a local Ghanaian language. Interviewers, who had previous experience with

anthropometry and nutrition surveys, were from the local communities and received an intensive 3-day training in survey administration and standardized anthropometric measurement prior to beginning data collection. Interviewers were closely supervised by study investigators, and the data collected were reviewed daily to maintain quality control.

Prior to survey administration, verbal consent was obtained from all participants. Participants were assured that all information obtained would be confidential, would be used only for research purposes, and that their participation would not affect their access to nutrition or food assistance programs in the camp, nor would be used for determining repatriation. The study received Institutional Review Board approval from the University of Connecticut and the University of Ghana. Additional approval to conduct data analysis came from Yale University. Permission to defer ethical approval to the collaborating Universities was provided by representatives of Buduburam Refugee Settlement. Data were de-identified and maintained in a secure, locked file cabinet by the principal investigator.

2.2.1 | Outcome variable

The main outcome variable was whether or not mothers' EBF the index child for the first 6 months of life. Mothers were asked if they breastfed the index child, and when water or other liquids were first introduced to the index child. Similarly, mothers were asked when solids or semisolid foods were first introduced to the index child. Responses for both multiple choice questions ranged from less than 1 month to greater than 7 months. If the mother indicated that either water and/or liquids/solids/semi solid foods were introduced before 6 months, then that child was classified as not EBF (coded as 0). If the mother indicated that both water and liquids/solid/semi solid foods were introduced at 6 months or later, then that child was classified as EBF (coded as 1).

2.2.2 | Independent variable and covariates

The main four-level independent acculturation proxy variable was computed from data on the mother's: nationality, time spent living in Ghana, and where she lived in Ghana (for Ghanaians). Nationality was defined by the mother's self-report of her nationality, Liberian or Ghanaian. Time spent living in Ghana (excluding any time abroad) was asked of all participants. If mothers spent time abroad, they were asked to identify which countries and length of time abroad.

To assess acculturation, two categories were created for Liberians using the median length of time living in Ghana (8 years) among Liberians: Liberians living in Ghana less than 8 years and Liberians living in Ghana at least 8 years. Location of residence was not used to assess acculturation among Liberian refugees because of the following: (a) EBF rates were very similar between Liberians living in zones 1–10 and 11–12 (70% and 66%, respectively) suggesting location did not influence EBF among this population, and (b) the variable identifying the zone where Liberians lived was not considered a sufficient proxy for acculturation, which typically includes variables such as language preferences, place of birth, nativity, and length of time in the new country (Pérez-Escamilla & Putnik, 2007). Ghanaians were classified based on where they lived. Ghanaians living in zones 11–12 were classified as such, while Ghanaians living in Awutu comprised another

comparison group to identify if any differences in EBF behavior existed between those living within or outside of the camp. The resulting four-level independent acculturation proxy variable included the following: (a) Liberians living in Ghana less than 8 years, (b) Liberians living in Ghana at least 8 years, (c) Ghanaians living in zones 11–12, and (d) Ghanaians living in Awutu. To validate this variable as a proxy for acculturation, it was crossed with other acculturation proxies (i.e., birth country, country raised in, and environment raised in) and was found to be highly correlated.

Key covariates that were assessed included: maternal age, age of index child, maternal body mass index (BMI), parity, and social capital. Maternal age was self-reported. The exact age of the index child was obtained by using the date that the survey was administered and the child's date of birth obtained from his/her weighing and vaccination card. Maternal BMI was obtained from measured maternal weight and height. Parity was assessed using the question, *How many children have you given birth to?* Social capital was obtained by asking, *During the past 12 months, have you borrowed money from any neighbors, family members, or friends?* Maternal and child anthropometric measurements were taken using weight, height, mid-upper arm circumference, and head circumference (index child only) following standard recommended procedures. Maternal health status was assessed by asking mothers to rate their own health in the last 6 months. Food insecurity over the past 6 months was assessed using an adapted version of the 16-item Latin American & Caribbean Household Food Security Scale (Pérez-Escamilla et al., 2009). This scale was pretested in Buduburam and since then has been validated globally. It is the source of the Food and Agriculture Organization Food Insecurity Experience Scale, which has been psychometrically validated in over 150 countries (FAO, 2016).

2.3 | Statistical analyses

All statistical analyses were conducted with SAS 9.3 (SAS Institute Inc., 100 SAS Campus Drive, Cary, NC, USA). Chi-squared tests were used for bivariate analyses of categorical variables, and t-tests were used for analyses of continuous variables. Differences were considered significant at $p < 0.05$. Unadjusted odds ratios and 95% confidence intervals were used to report the bivariate associations between key covariates and EBF. Variables with a p -value < 0.10 in bivariate analyses were included in the full multivariate binomial logistic regression model to identify significant predictors of EBF. Stepwise backward elimination was used to specify the final model. This involved manually removing a non-significant variable at each step and assessing changes in the model likelihood ratio. After removing a nonsignificant variable, if a decrease in the likelihood ratio was observed and this difference was less than the chi-squared critical value, then the variable was eliminated with each step. Factors known to be associated with EBF including age of the index child, parity, mother's BMI, and mother's age were kept in the final model (Pérez-Escamilla et al., 1995). The final model included mother's BMI, mother's age (years), child age (months), parity, borrowed money from neighbor/family in last year, and the four-level acculturation proxy variable combining nationality and time living in Ghana. Interactions between pairs of independent variables in the multivariate model were tested, but none were found.

3 | RESULTS

Of the 480 mothers who completed the survey, approximately 98% ($n = 472$) breastfed their infant. Of those, 290 mothers (60.5%) exclusively breastfed for at least 6 months. The mean age of the participants was 28.0 ± 6.3 years, and the average maternal BMI was 24.6 ± 5.2 kg/m². Approximately half of women surveyed were Liberian (49.8%), and the other half were Ghanaian (50.2%). The highest level of formal education for most women was 7–11 years of schooling (44.9%), and 23.5% were high school graduates. Nearly three quarters of the women surveyed (74.4%) knew how to read or write. The majority of women were self-employed and multiparous (62.0% and 68.1%, respectively). Although the majority of mothers rated their child's health at or above average (73.5%), nearly a quarter of children (24.4%) were stunted. Approximately half of all participants were married (49.8%), and 26.0% were either single or never married.

Table 1 shows bivariate associations between the likelihood of EBF for at least 6 months and the independent variables and covariates. Women were more likely to EBF for at least 6 months compared to their counterparts if they were: born in Liberia, born in a city, could read or write, and borrowed money from their neighbors in the last 6 months. Liberians were significantly more likely to EBF (68.5%; 95% CI: 62%–74%) compared to Ghanaians (52.7%; 95% CI: 46%–59%). Liberians living in zones 1–10 had the highest percentage of EBF (70.6%; 95% CI: 62%–79%), while Ghanaians living in zones 11–12 had the lowest (49.6%; 95% CI: 40%–59%). The acculturation proxy variable showed that Liberians living in Ghana at least 8 years were the most likely to EBF (72.9%; 95% CI: 64%–80%) compared to Liberians living in Ghana less than 8 years (63.3%; 95% CI: 54%–72%), Ghanaians living in zones 11–12 (49.6%; 95% CI: 40%–59%), and Ghanaians living in Awutu (55.8%; 95% CI: 46%–65%).

Table 2 shows the results of the multivariate regression model and presents both unadjusted odds ratios (OR) and adjusted OR for each independent variable in relationship to EBF. In unadjusted logistic regression analyses, participants who borrowed money from a neighbor or family member in the last year were significantly more likely to EBF (OR: 1.53, 95% CI: 1.05, 2.23) compared to those who did not borrow money. Liberians who lived in Ghana at least 8 years were significantly more likely to EBF (OR: 2.13, 95% CI: 1.25, 3.61) compared to Ghanaians living in Awutu. This finding remained significant in multivariate analyses demonstrating that odds of EBF among Liberian mothers who lived in Ghana for at least 8 years were still higher (OR: 1.78, 95% CI: 1.02, 3.09) compared to Ghanaians who lived in Awutu, even when adjusted for mother's BMI, mother's age (years), child age (months), primiparous, and borrowed money from neighbor/family in last year.

4 | DISCUSSION

This study identified a unique finding, strongly suggesting that exposure to the local context matters for understanding breastfeeding behaviors among refugees moving from one country to another in close geographical proximity within Sub-Saharan Africa. The multivariate model revealed that Liberian refugees who had lived in

Buduburam for at least 8 years, and as a result were likely to be more familiar with Ghana's Buduburam settlement, had even better EBF rates compared to local Ghanaians living outside the camp. This is contrary to existing literature on the inverse relationship between acculturation and optimal breastfeeding practices among immigrants who have moved into the USA and other developed countries. One reason may be the classification of our variable as acculturation. Although the role of acculturation in determining health outcomes has been significantly studied and well documented, there is continuous debate on how to accurately define and measure this complex process (Pérez-Escamilla & Putnik, 2007). Acculturation proxies such as language, spoken, generational status, and proportion of one's life spent in the USA are frequently used in acculturation research (Cruz et al. 2008). However, these static proxies may not always explain the dynamic contextual factors that also influence health outcomes (Lopez-Class, Castro, & Ramirez, 2011). In an attempt to interpret the meaning of the "acculturation proxy" of time living in Ghana, we conducted further analyses that found no associations of this proxy with political knowledge, friends' ethnicity, and language preferences. As a result, we cannot conclude that Liberians living in Ghana for a longer period of time were more acculturated than Liberians living in Ghana for less time. Rather, we hypothesize that the greater EBF rates among Liberians living in Ghana for at least 8 years may be best explained by factors other than acculturation such as varying migration patterns among Liberians, traditional breastfeeding beliefs among Ghanaians, and more exposure to strong breastfeeding support within the Buduburam refugee health system.

The prevalence of EBF among Liberians and Ghanaians in Buduburam varied from the breastfeeding rates reported in the DHS surveys of both countries conducted at around the same time that our study was implemented. Although the prevalence of EBF among Liberians in Buduburam (68.5%) was higher than the 2007 Liberian DHS rate (29%), the prevalence of EBF among all Ghanaians in the study (52.7%) was similar to the 2013 Ghanaian DHS data (52%) (International Baby Food Action Network, 2012; GSS, 2009). These differences may be attributed to varying demographic characteristics of Liberians who fled as refugees versus those who remained in Liberia and varying characteristics of the Ghanaians living in Buduburam or in close proximity to the settlement. Regional differences in early introduction of solid foods have been found in Liberia, with rates as high as 51.3% in the capital, Monrovia, and as low as 4.3% in the North Western region (Issaka et al., 2014). Thus, it is possible that Liberians in our sample may have originated from regions of Liberia where EBF may be more common. Interviews with West African refugees in Australia revealed that mothers practiced EBF due to a lack of access to sufficient food and money (Loescher & Milner, 2009). It is possible that this belief was held by Liberian mothers in Buduburam and that their higher rates of EBF were due to financial barriers. Moreover, nearly 44% of Liberians lived in another country before settling in Ghana. Among those, 81% lived in only one other country, with 77% living in the Ivory Coast. The majority of those living in another country lived in that country for at least a year (93%). Of those that settled in more than one country before settling in Ghana, 75% lived in the Ivory Coast at one time (data not shown in tables). Thus, EBF rates of Liberian refugees living in Buduburam may have

TABLE 1 Participant demographics among Ghanaians and Liberians settled in Ghana^a

Participant characteristics	Whole sample (n = 480)	Exclusive breastfeeding		p
		Yes (n = 290)	No (n = 189)	
	n (%)	Mean ± SD	Mean ± SD	
Age of mother	28.0 ± 6.3	28.3 ± 6.3	27.7 ± 6.3	0.356
BMI of mother	24.6 ± 5.2	25.0 ± 5.5	24.0 ± 4.6	0.039
Years living in Buduburam ^b	8.3 ± 6.3	8.4 ± 5.6	8.0 ± 7.3	0.612
Age of index child (months)	25.9 ± 13.8	25.8 ± 13.6	26.0 ± 14.2	0.879
	n (%)	n (%)	n (%)	p
Location				0.003
Liberians in zones 1–10	120 (25.0)	84 (70.6)	35 (29.4)	
Liberians in zones 11–12	119 (24.8)	79 (66.4)	40 (33.6)	
Ghanaians in zones 11–12	121 (25.2)	60 (49.6)	61 (50.4)	
Ghanaians in Awutu village	120 (25.0)	67 (55.8)	53 (44.2)	
Nationality				0.0004
Liberian	239 (49.8)	163 (68.5)	75 (31.5)	
Ghanaian	241 (50.2)	127 (52.7)	114 (47.3)	
Country born in				0.001
Liberia	237 (49.4)	162 (68.6)	74 (31.4)	
Ghana	235 (49.0)	125 (53.2)	110 (46.8)	
Other	8 (1.7)	3 (37.5)	5 (62.5)	
Country grew up in				0.008
Liberia	177 (38.0)	118 (66.7)	59 (33.3)	
Ghana	250 (53.7)	136 (54.6)	113 (45.4)	
Liberia and Ghana	15 (3.2)	13 (86.7)	2 (13.3)	
Other	24 (5.2)	17 (70.8)	7 (29.2)	
Birth place				0.003
City	210 (44.2)	141 (67.5)	68 (32.5)	
Town	221 (46.5)	129 (58.4)	92 (41.6)	
Village	30 (6.3)	16 (53.3)	14 (46.7)	
Refugee camp	14 (3.0)	3 (21.4)	11 (78.6)	
Marital status				0.665
Single/never married, widowed or divorced	136 (28.3)	86 (63.7)	49 (36.3)	
Married	239 (49.8)	141 (59.0)	98 (41.0)	
Not married but has partner	105 (21.9)	63 (60.0)	42 (40.0)	
Primiparae				0.550
No	327 (68.1)	195 (59.6)	132 (40.4)	
Yes	153 (31.9)	95 (62.5)	57 (37.5)	
Primary occupation				0.349
Employed by someone	9 (1.9)	7 (77.8)	2 (22.2)	
Self-employed	292 (61.0)	180 (61.9)	111 (38.1)	
Not employed	178 (37.2)	102 (57.3)	76 (42.7)	
Daily income (GH cedi)				0.037
0–5.00	281 (59.7)	183 (65.1)	98 (34.9)	
Greater than 5.00	190 (40.3)	105 (55.6)	84 (44.4)	
Self-report mother's health in last 6 months				0.506
Below average	197 (41.1)	122 (62.2)	74 (37.8)	
At or above average	282 (58.9)	167 (59.2)	115 (40.8)	
Highest level of formal education				0.507
No education	62 (13.0)	36 (58.1)	26 (41.9)	
1–6 years (some or completed primary)	74 (15.5)	44 (59.5)	30 (40.5)	
7–11 years (some secondary)	214 (44.9)	123 (57.5)	91 (42.5)	

(Continues)

TABLE 1 (Continued)

Participant characteristics	Whole sample (n = 480)	Exclusive breastfeeding	
		Yes (n = 290)	No (n = 189)
High school graduate	112 (23.5)	75 (67.6)	36 (32.4)
Higher ed. (some college & graduate)	15 (3.1)	9 (60.0)	6 (40.0)
Know how to read or write			0.004
Yes	357 (74.4)	229 (64.3)	127 (35.7)
No	123 (25.6)	61 (49.6)	62 (50.4)
Borrowed money from neighbors/family in past year			0.028
No	285 (59.4)	161 (56.5)	124 (43.5)
Yes	195 (40.6)	129 (66.5)	65 (33.5)
Lent money to neighbors/family in past year			0.243
Yes	155 (32.3)	88 (56.8)	67 (43.2)
No	325 (67.7)	202 (62.4)	122 (37.7)
Self-report child's health in last 6 months			0.814
Below average	127 (26.5)	78 (61.4)	49 (38.6)
At or above average	353 (73.5)	212 (60.2)	140 (39.8)
Acculturation			
Time living in Ghana			0.001
Liberians living there less than 8 years	109 (22.8)	69 (63.3)	40 (36.7)
Liberians living there at least 8 years	130 (27.2)	94 (72.9)	35 (27.1)
Ghanaians in zones 11–12	119 (24.9)	59 (49.6)	60 (50.4)
Ghanaians in Awutu	120 (25.1)	67 (55.8)	53 (44.2)

n (%): proportion per category

^anumbers do not add up to 100% due to rounding

^bdoes not include Ghanaians living in Awutu villages

TABLE 2 Logistic regression of determinants of exclusive breastfeeding among Ghanaians and Liberians settled in Ghana^a

Characteristic	Unadjusted		Multivariate	
	n	OR (95% CI)	n	AOR (95% CI)
Age of mother	475	1.01 (0.98, 1.04)	466	1.02 (0.98, 1.06)
BMI of mother	479	1.04 (1.00, 1.08)	466	1.03 (0.99, 1.07)
Age of index child	470	1.00 (0.99, 1.01)	466	0.99 (0.98, 1.01)
		OR (95% CI)		AOR (95% CI)
Primiparae				
No	327	1.00	315	1.00
Yes	152	1.13 (0.76, 1.68)	151	1.17 (0.73, 1.88)
Borrowed money from neighbors/family in past year				
No	285	1.00	275	1.00
Yes	194	1.53 (1.05, 2.23)	191	1.34 (0.89, 2.02)
Acculturation				
Time living in Ghana				
Ghanaians in Awutu	120	1.00	114	1.00
Liberians living there less than 8 years	109	1.37 (0.80, 2.32)	108	1.25 (0.71, 2.21)
Liberians living there at least 8 years	129	2.13 (1.25, 3.61)	129	1.78 (1.02, 3.09)
Ghanaians in zones 11–12	119	0.78 (0.47, 1.29)	115	0.72 (0.42, 1.23)

Note. OR = Unadjusted odds ratio; AOR = Adjusted odds ratio; CI = 95% confidence interval

^aVariables removed from multivariate model: marital status, income, and reading/writing ability

Hosmer and Lemeshow goodness of fit statistic: $p = 0.992$

been influenced by Ivory Coast infant feeding traditions because most of them were exposed to the Ivory Coast culture for at least a year before settling in Ghana.

Another potential explanation for greater EBF practices among Liberians compared to Ghanaians may include breastfeeding misconceptions among Ghanaians. Reasons for early introduction of liquids

or solids when the infant was 4–5 months old included the following: believing the infant was thirsty, that breast milk was not nutritious enough, and that EBF would make it harder for infants to eventually eat solid food (Aryeetey & Goh, 2013). Sub-group analyses from our study indicate that there are educational differences between Liberians and Ghanaians that may potentially explain these traditional beliefs. These findings may be due to Ghanaians having less access to educational opportunities than Liberians (N'Tow, 2004). Ghanaians were less likely to complete high school compared to Liberians (7.5% vs. 42.0%, respectively). Migrant mothers with greater education levels have been more likely to breastfeed in Italy (Golin et al., 2003). Similarly, previous studies have shown that early introduction of solid, semisolid, or soft foods has been associated with mothers having no schooling (Issaka et al., 2014).

Finally, differences in EBF rates between Liberians and Ghanaians may be due to the strong breastfeeding support received in the camp. Breastfeeding support was an important component of the nutrition program that was established in Buduburam in 2005 (Sandow, 2012). An infant feeding study by Sandow in 2012 conducted among Liberian refugees living in Buduburam found that 80% of female caregivers reported EBF their index child for an average of 4.8 months, with most (>80%) doing so because it was recommended by health personnel (Sandow, 2012). In fact, those who received breastfeeding counselling from health personnel were more than two times as likely to EBF for 6 months compared to those who did not receive counseling (Sandow, 2012).

Our findings that Ghanaians living within zones 11–12 had the lowest rates of EBF compared to Liberians living in zones 1–10, Liberians living in zones 11–12, and Ghanaians living in Awutu (49.6% vs. 70.6%, 55.8%, and 66.4, respectively) suggest that Ghanaians living in Buduburam may not have had similar access to settlement EBF education/support resources. Findings from Sandow suggests that settlement characteristics, especially the increased promotion and support of breastfeeding received by Liberian refugees within the settlement, are potential factors driving differences in EBF outcomes seen in this study. These findings are supported by randomized trials demonstrating that additional breastfeeding support can substantially improve breastfeeding outcomes, including EBF rates (Anderson, Damio, Young, Chapman, & Pérez-Escamilla, 2005). By increased support for EBF within a refugee settlement environment, improvements in breastfeeding can be achieved in challenging situations. These findings can translate to important policy implications to support more training of health personnel within protracted situations as well as in the host population within and around the refugee camp to promote and support EBF.

This study has several strengths. As mentioned previously, as far as we know, this is the first study to explore breastfeeding practices among refugees living in a long-term camp or settlement in a country in close proximity from their country of origin. Moreover, it is the first study to specifically focus on EBF practices among refugee populations and their host population in West Africa. Studies on refugee health and acculturation have focused on dietary practices and health outcomes of migrants, but this study is unique in scope by focusing on the relationship between acculturation and breastfeeding practices that are key infant health determinants. The close relationship and trust that

was developed between the research team and members of the community enabled the successfulness of the study in a hard to reach environment. In addition, pilot-testing the survey tool and using interviewers from both communities ensured that the survey was culturally appropriate and carefully tailored to the target community.

Though the sample size was large and included respondents from the four different populations in and outside the camp, there were some limitations to this study. First, the percentage of mothers who refused to participate in the study among those who were approached was not tracked; thus, the proportion of women that declined study participation is unknown. Second, as a cross-sectional study, it is not possible to establish the temporal sequence of events although it is implausible to expect that EBF led to how long immigrants decided to stay in Ghana. Rather, this information was collected retrospectively, and thus, it is safe to assume that it is indeed the degree of exposure to Ghana that is associated with EBF behaviors among Liberian refugees. Third, all variables were self-reported and the infant feeding recall period was long, thus introducing the potential for misclassification of EBF. However, the strong association found in this study between ethnic group and EBF in spite of potential measurement error in EBF indicates that the findings are indeed robust. Fourth, age of the child is known to be associated with EBF; however, this was not the case in our study. This may be attributed to the fact that only children between age 6 months and 5 years were included in the study; thus, it was not expected for this association to be present in our retrospective study. Though the population in this study is unique, this may limit the generalizability of our results to similar refugee populations or only certain protracted refugee situations. Finally, data to understand “mechanisms” explaining EBF differences were not collected. For example, in order to better understand the differences between the Liberians living in Buduburam for at least 8 years and Liberians who arrived more recently, the survey could have included detailed questions regarding migration patterns and reasons why Liberians left their homes for the refugee camp. In addition, including questions regarding the utilization of the health clinic services by Liberians and Ghanaians could help us confirm findings by Sandow, as well as understand the EBF rate differences between Liberians and Ghanaians (Sandow, 2012). If Liberians living in the settlement longer were more likely to use the health services available in the camp, such as health education and breastfeeding assistance, this could be a potential explanation for the increased EBF rates compared to Ghanaians who do live in the camp and are less likely to use these services.

4.1 | Conclusions and recommendations

Overall, this study demonstrates that the longer Liberians lived in Ghana, the better the EBF duration, perhaps as a result of unique EBF education/support opportunities offered to them through the Buduburam settlement experience that were not available to Ghanaians. Further mixed methods research designed to understand the “mechanisms” explaining these findings will be crucial for improving breastfeeding in both refugee settlements and host communities in low and middle income countries. Additionally, continual monitoring of child nutrition behaviors, including breastfeeding and other infant

feeding practices, is vital for maintaining and improving maternal and infant health within protracted refugee situations.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

CONTRIBUTIONS

AHF, RPE, AL, DG, and AS participated in the study design, data collection, interpretation of results and revision of the manuscript. MW participated in the data analysis, interpretation of results, and writing of the manuscript.

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